

The main critical issues of the gym environment in an Italian city

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Abstract

Background. The lack of a consistent national regulation regarding gym facilities, combined with the growth and transformation of the world of fitness, has led to an uncontrolled situation, where, especially in metropolitan areas, low cost gyms are continuously popping up, often not respecting the structural and hygienic requirements.

Aim of the study. Objective of this study is to evaluate the results of a monitoring programme about the gym environment, to highlight the main critical issues.

Methods. In 2018 a randomized sample of 90 gyms was inspected in Milan, using a checklist with three sections of inquiry and the resulting data were analysed through a series of multivariate regression models.

Results. As per the various aspects analysed, many outcomes with low scores concerned franchised gyms, which have shown to be unsatisfactory in many respects; in addition, the lack of *L. pneumophila* risk containment procedures has been observed in the facilities without a swimming pool, compared to those with it.

Conclusions. The study results offer a clear picture of the gym environment, identifying many inadequacies for different hygienic and safety aspects; therefore, it has been possible to understand which issues need particular attention in order to normalize the situation, which should be checked by future investigative steps.

Introduction

Physical exercise has been proven essential for a healthy life (1, 2). WHO promotes physical activity as crucial to health throughout life (3). Insufficient physical activity has a strong impact on the increase of cardiovascular diseases and overweight (4, 5), and, planning regular exercise helps to prevent mental stress (6). People involved in physical activity are

increasing significantly: in 2017, four out of ten Europeans declared to exercise or play sports at least once a week (7). In the same year in Italy 33.9% of the population over three years of age (19 million and 972 thousand individuals) practiced one or more sports in their leisure time; 24.8% (14.6 million) asserted to practice sport regularly and 9.1% (5.4 million) only occasionally (8). This need for physical exercise has resulted in a growing attendance of gyms (9): in 2017

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there were more than 59,000 fitness clubs in Europe with around 60 million members; moreover, the European fitness market was the largest in the world, with a total turnover of about EUR 26.6 billion (10). Italy ranks fourth after Germany, United Kingdom, and France both in terms of market size (8% of the whole European market with EUR 2.2 billion) and membership with 5.3 million club users (10). In 2018 Italy counted more than 70,000 fitness companies (this datum referring to both gym facilities and beauty centres, massage centres, etc), a value increased by 1.6% in the last year and by 5.3% over the last three years; Lombardy Region covers a sixth of the national number of clubs (around 12,000 active companies, increased by 2% in the last year and by 7.2% over the last three years) (11). In Milan, there are 3,848 fitness and wellness centres (5.4% of the national total, increased by 9.2% since 2015); Milan is the first city in Italy both for market share (almost EUR 3 billion) and employees (more than 19,000) (11). Taking into account only gym facilities, Milan counted 321 active clubs in 2018 (11). In Italy, only a small number of gyms are members of the national federation (Italian Olympic Committee – CONI) and for this reason they are subject to specific regulations (12). The construction sector of sports facilities and premises is regulated by the Ministerial Decree (D.M.) 18/03/1996 (13), modified by the D.M. 06/06/2005 (14), which states only the basic requirements for all kinds of outdoor sport facilities (e.g. football pitches, etc.), not considering the peculiarities of the indoor environment of fitness clubs. Furthermore, given the autonomy granted by the Constitutional reform through law No. 3/2001 (15) to Italian regions, at the moment, in Italy there is a blatant absence of a consistent regulation in the matter of gym hygiene and safety (16). In Lombardy Region, sport activities are regulated by the Regional Law 26/2014 (17), which emphasizes the legal obligation

to employ qualified trainers, but does not consider the issue of minimum safety standards in fitness clubs. Moreover, unlike other kinds of activities, i.e. wellness centres, as well as tattooists and piercing makers, gyms in Milan can be opened without prior notification to the Public Health Authority. Simultaneously, in the last few years, the gym market has undergone a transformation especially in metropolitan areas where low budget gyms are being constantly opened (18), so that the safety issue in fitness centres has become critical (19, 20). The gym indoor environment, for its peculiar characteristics, exposes users, as well as employees, to physical, chemical and biological hazards. Health risks are mainly due to inadequate indoor air quality (21-23) and low hygienic status of surfaces and premises (24), because of a possible poor management of the clubs. Moreover, several injuries might occur because of the specific physical activities carried out in gyms (25-27). In addition to what mentioned above, the improper use of the facilities increases potential hazards (28, 29). The purpose of this study is to evaluate the results of the monitoring programme of the gym environment in Milan highlighting the main critical issues, to steer public health activities.

Methods

Area of study

In 2018, a random sample of 90 gyms extrapolated from the list of gym facilities active in Milan was inspected. The surveys were carried out by the personnel of the Milan Public Health Agency.

Study instrument and data collection

The on-site investigations were conducted using an anonymised checklist with three sections of inquiry. In the first part of the checklist, the epidemiological data were collected: when the gym under investigation

was opened, the number of registered users and employees, the geographical location (city centre or suburbs), and the ownership of the gym (franchise or private facility); in addition, the presence of ancillary rooms such as offices, infirmary, and storage rooms was investigated, as well as the availability of other activities such as medical care, beauty centres and swimming pools. In the second section the correct installation of the gym equipment was checked, focusing the attention on the crossover cable machine, which - if not duly anchored to the floor - may overturn during its usage. In addition, the entire status of the facility (fitness area, lockers, toilets and sanitation facilities for employees) was investigated from a hygienic-structural and aero-lighting point of view. In the third part of the checklist, all relevant documentation available c/o the facilities was controlled, such as: the derogation from Art. 65 of the Legislative Decree 81/2008 (30), which allows to work in underground or semi-underground rooms; the presence of a consistent blueprint of the gym premises; the certification of electricity and gas systems; the presence of cleaning-sanitization procedures and the containment of *L. pneumophila* risk procedures. Not all the investigated items were applicable to the set of samples (e.g. a gas system was not always present).

Statistical analysis

Collected data were analysed through multivariate regression models, estimating the odds ratio (OR) and the corresponding 95% confidence intervals (95% CI) for each of the following outcomes: an inadequate hygienic-structural and aero-lighting status of the fitness area, a poor hygienic-structural and aero-lighting status of lockers, an inadequate hygienic-structural and aero-lighting status of toilets, a poor status of employees-dedicated services (if present), the incorrect installation of the gym equipment, the lack of electrical system certification, the lack of gas system certification (if present), the lack

of cleaning and sanitizing procedures, and the lack of adequate *L. pneumophila* risk containment procedures. The independent variables considered were the ownership of the gym (privately-owned or franchised), the location of the gym (city centre or suburbs), the number of users (< 100, 100 to 999 or ≥ 1,000), the year of the opening (from 2015 onwards, when new guidelines for prevention of legionellosis were published (31), or before), and the presence of a swimming pool in the gym (requirements for preventing legionellosis are less specific in the absence of a swimming pool (31)). All analyses were performed using SAS 9.4 (SAS Institute, Cary, North Carolina, USA).

Results

Results show that: the year of opening ranged from 1963 to 2018 (median 2005.5); the number of users ranged from 15 to 6,000 (median 650 – average 1,168.48); the number of employees ranged from 15 to 90 (median 17 – average 16.24); 58 gyms (64.44%) were privately-owned and 32 (35.56%) were franchised; 44 gyms were located in the city centre and 46 (51.11%) in periphery; 47 gyms (52.22%) were equipped with an office, 74 (82.22%) with a storage room and 46 (51.11%) with an infirmary; medical care was performed in 35 gyms (38.89%), in 20 gyms (22.22%) there were beauty centres and 17 gyms were equipped with a swimming pool (Table 1).

Among the results of the documentary evidence the worst situation was related to the lack of *L. pneumophila* risk containment procedures in 78 gyms (86.67%). In 63 facilities (70%) no cleaning and sanitizing procedures were found either. Moreover, in 50 gyms (55.56%) the electrical system certification turned out to have expired, as well as the certification of the gas system in 20 gyms (22.22%), which means in more than 66% of the facilities equipped with gas system.

Table 1 - Descriptive data

Year of opening		
Min		1963
Max		2018
Median		2005.5
Number of users		
Min		15
Max		6,000
Median		650
Average		1,168.48
Number of employees		
Min		1
Max		90
Median		17
Average		16.24
Ownership		
Private facility		58 (64.44%)
Franchise		32 (35.56%)
Location		
City centre		44 (48.89%)
Suburbs		46 (51.11%)
Presence of ancillary rooms		
Office		47 (52.22%)
Storage room		74 (82.22%)
Infirmary		46 (51.11%)
Presence of other activities		
Medical care		35 (38.89%)
Beauty centres		20 (22.22%)
Swimming pools		17 (18.89%)

When during the on-site visit blueprints were available in the structure, they were consistent with the premises in 31 gyms (34.44%); in 17 gyms (18.89%) the disregard of art. 65 of Legislative Decree 81/2008 (30), which allows to work in underground or semi-underground rooms, was present.

The analysis of the material evidence items showed that in 17 gyms, more than a third of the inspected gyms equipped with machines and tools, these were improperly fixed to the floor. Regarding the hygienic-structural and aero-lighting status, the worst conditions were pointed out in lockers and toilets.

Considering the total number of the inspected gyms only six of them (6.67%) complied with all the items investigated.

In the multivariate analysis the estimated ORs of low hygienic-structural status were 2.82 (95% CI: 1.03, 7.73) for lockers and 3.96 (95% CI: 1.31, 11.96) for toilets in franchised gyms compared to privately-owned facilities. The estimated OR of the poor status of employees-dedicated services was 5.74 (95% CI: 1.27, 25.90) in gyms with ≥ 1000 users compared to gyms with 100 to 999 users. The estimated ORs of improper installation of gym equipment was 0.06 (95% CI: 0.01, 0.43) in gyms located in the suburbs compared to city centre fitness clubs and 8.55 (95% CI: 1.39, 52.81) in franchised gyms compared to privately-owned clubs. The estimated OR concerning the lack of adequate *L. pneumophila* risk containment procedures was 8.64 (95% CI: 1.63-45.82) in gyms without a swimming pool compared to gyms with a swimming pool. Other items were investigated, but only those reported here were statistically significant at 0.05 level (Table 2).

Discussion and conclusions

The most alarming result of this study is the lack of proper procedures and certifications. Obviously outdated certification of the electrical and gas system or the absence of *L. pneumophila* risk containment procedures expose customers as well as employees to the risk of major injuries; various studies described *L. pneumophila* infections in gym users (32, 33). Moreover, the presence of hygienic-structural and aero-lighting inadequacies reflects what was observed in other Italian regions (34).

The results of the multivariate analyses on the material evidence items have highlighted the need for special focus on low-cost franchised clubs, where the hygienic status of lockers and toilets, and the installation

Table 2 (A-L) - Distributions of gyms and odds ratios for inadequacy of outcomes with corresponding 95% confidence interval. Odds ratios and confidence intervals were calculated, for each outcome, from a multivariate logistic model including all the variables in the first column as independent variables (namely: property, year of opening and number of users for A-K; in addition, the presence or absence of a swimming pool for L). * indicates statistical significance at 5%.

		A. Hygienic-structural status (gym)			
		Adequate	Inadequate	Odds ratio	95% confidence interval
Location	City centre	41 (50.62%)	3 (33.33%)	1.00	
	Periphery	40 (49.38%)	6 (66.67%)	3.41	0.57, 20.39
Property	Company-owned	52 (64.20%)	6 (66.67%)	1.00	
	Franchised	29 (35.80%)	3 (33.33%)	1.37	0.28, 6.76
Year of opening	< 2015	42 (51.85%)	5 (55.56%)	1.05	0.23, 4.88
	≥ 2015	39 (48.15%)	4 (44.44%)	1.00	
Number of users	< 100	11 (13.58%)	3 (33.33%)	6.94	0.96, 50.14
	≥ 100 \wedge < 1000	44 (54.32%)	3 (33.33%)	1.00	
	≥ 1000	26 (32.10%)	3 (33.33%)	1.51	0.28, 8.30
Total		81 (100.00%)	9 (100.00%)		
		B. Aero-lighting status (gym)			
		Adequate	Inadequate	Odds ratio	95% confidence interval
Location	City centre	42 (50.00%)	2 (33.33%)	1.00	
	Periphery	42 (50.00%)	4 (66.67%)	2.55	0.33, 19.95
Property	Company-owned	54 (64.29%)	4 (66.67%)	1.00	
	Franchised	30 (35.71%)	2 (33.33%)	1.45	0.21, 9.97
Year of opening	< 2015	43 (51.19%)	4 (66.67%)	1.90	0.28, 13.04
	≥ 2015	41 (48.81%)	2 (33.33%)	1.00	
Number of users	< 100	12 (14.29%)	2 (33.33%)	6.34	0.65, 62.19
	≥ 100 \wedge < 1000	45 (53.57%)	2 (33.33%)	1.00	
	≥ 1000	27 (32.14%)	2 (33.33%)	1.55	0.20, 12.16
Total		84 (100.00%)	6 (100.00%)		
		C. Hygienic-structural status (lockers)			
		Adequate	Inadequate	Odds ratio	95% confidence interval
Location	City centre	32 (49.23%)	12 (48.00%)	1.00	
	Periphery	33 (50.77%)	13 (52.00%)	1.30	0.46, 3.63
Property	Company-owned	46 (70.77%)	12 (48.00%)	1.00	
	Franchised	19 (29.23%)	13 (52.00%)	2.82*	1.03, 7.73
Year of opening	< 2015	35 (53.85%)	12 (48.00%)	0.89	0.33, 2.39
	≥ 2015	30 (46.15%)	13 (52.00%)	1.00	
Number of users	< 100	10 (15.38%)	4 (16.00%)	1.60	0.38, 6.83
	≥ 100 \wedge < 1000	35 (53.85%)	12 (48.00%)	1.00	
	≥ 1000	20 (30.77%)	9 (36.00%)	1.17	0.40, 3.39
Total		65 (100.00%)	25 (100.00%)		

D. Aero-lighting status (lockers)

		Adequate	Inadequate	Odds ratio	95% confidence interval
Location	City centre	39 (50.65%)	5 (38.46%)	1.00	
	Periphery	38 (49.35%)	8 (61.54%)	1.93	0.50, 7.38
Property	Company-owned	53 (68.83%)	5 (38.46%)	1.000	
	Franchised	24 (31.17%)	8 (61.54%)	3.51	0.97, 12.69
Year of opening	< 2015	41 (53.25%)	6 (46.15%)	0.75	0.21, 2.66
	≥ 2015	36 (46.75%)	7 (53.85%)	1.00	
Number of users	< 100	13 (16.88%)	1 (7.69%)	0.85	0.08, 8.75
	≥ 100 \wedge < 1000	41 (53.25%)	6 (46.15%)	1.00	
	≥ 1000	23 (29.87%)	6 (46.15%)	1.53	0.42, 5.53
Total		77 (100.00%)	13 (100.00%)		

E. Hygienic-structural status (toilets)

		Adequate	Inadequate	Odds ratio	95% confidence interval
Location	City centre	36 (51.43%)	8 (40.00%)	1.00	
	Periphery	34 (48.57%)	12 (60.00%)	2.10	0.66, 6.70
Property	Company-owned	50 (71.43%)	8 (40.00%)	1.00	
	Franchised	20 (28.57%)	12 (60.00%)	3.96*	1.31, 11.96
Year of opening	< 2015	38 (54.29%)	9 (45.00%)	0.68	0.23, 2.01
	≥ 2015	32 (45.71%)	11 (55.00%)	1.00	
Number of users	< 100	12 (17.14%)	2 (10.00%)	1.02	0.17, 6.10
	≥ 100 \wedge < 1000	37 (52.86%)	10 (50.00%)	1.00	
	≥ 1000	21 (30.00%)	8 (40.00%)	1.17	0.38, 3.64
Total		70 (100.00%)	20 (100.00%)		

F. Aero-lighting status (toilets)

		Adequate	Inadequate	Odds ratio	95% confidence interval
Location	City centre	40 (53.33%)	4 (26.67%)	1.000	
	Periphery	35 (46.67%)	11 (73.33%)	3.582	0.93, 13.77
Property	Company-owned	51 (68.00%)	7 (46.67%)	1.000	
	Franchised	24 (32.00%)	8 (53.33%)	2.794	0.83, 9.44
Year of opening	< 2015	39 (52.00%)	8 (53.33%)	0.901	0.27, 2.97
	≥ 2015	36 (48.00%)	7 (46.67%)	1.000	
Number of users	< 100	13 (17.33%)	1 (6.67%)	0.712	0.07, 6.95
	≥ 100 \wedge < 1000	39 (52.00%)	8 (53.33%)	1.000	
	≥ 1000	23 (30.67%)	6 (40.00%)	1.050	0.31, 3.61
Total		75 (100.00%)	15 (100.00%)		

G. Status of employees-dedicated services (if present)

		Adequate	Inadequate	Odds ratio	95% confidence interval
Location	City centre	17 (56.67%)	12 (63.16%)	1.00	
	Periphery	13 (43.33%)	7 (36.84%)	0.68	0.16, 2.82
Property	Company-owned	21 (70.00%)	11 (57.89%)	1.00	
	Franchised	9 (30.00%)	8 (42.11%)	2.83	0.68, 11.82
Year of opening	< 2015	15 (50.00%)	9 (47.37%)	1.49	0.39, 5.65
	≥ 2015	15 (50.00%)	10 (52.63%)	1.00	
Number of users	< 100	2 (6.67%)	3 (15.79%)	9.58	0.90, 101.61
	≥ 100 ∧ < 1000	18 (60.00%)	5 (26.32%)	1.00	
	≥ 1000	10 (33.33%)	11 (57.89%)	5.74*	1.27, 25.90
Total		30 (100.00%)	19 (100.00%)		

H. Installation of gym equipment

		Adequate	Inadequate	Odds ratio	95% confidence interval
Location	City centre	6 (21.43%)	11 (64.71%)	1.00	
	Periphery	22 (78.57%)	6 (35.29%)	0.06*	0.01, 0.43
Property	Company-owned	19 (67.86%)	6 (35.29%)	1.00	
	Franchised	9 (32.14%)	11 (64.71%)	8.55*	1.39, 52.81
Year of opening	< 2015	16 (57.14%)	7 (41.18%)	1.33	0.25, 6.95
	≥ 2015	12 (42.86%)	10 (58.82%)	1.00	
Number of users	< 100	1 (3.57%)	1 (5.88%)	0.44	0.02, 11.39
	≥ 100 ∧ < 1000	9 (32.14%)	9 (52.94%)	1.00	
	≥ 1000	18 (64.29%)	7 (41.18%)	0.26	0.05, 1.34
Total		28 (100.00%)	17 (100.00%)		

I. Electrical system certification

		Adequate	Inadequate	Odds ratio	95% confidence interval
Location	City centre	21 (52.50%)	23 (46.00%)	1.00	
	Periphery	19 (47.50%)	27 (54.00%)	2.01	0.79, 5.13
Property	Company-owned	27 (67.50%)	31 (62.00%)	1.00	
	Franchised	13 (32.50%)	19 (38.00%)	1.78	0.69, 4.63
Year of opening	< 2015	22 (55.00%)	25 (50.00%)	0.83	0.34, 2.06
	≥ 2015	18 (45.00%)	25 (50.00%)	1.00	
Number of users	< 100	3 (7.50%)	11 (22.00%)	4.08	0.92, 18.12
	≥ 100 ∧ < 1000	21 (52.50%)	26 (52.00%)	1.00	
	≥ 1000	16 (40.00%)	13 (26.00%)	0.57	0.21, 1.49
Total		40 (100.00%)	50 (100.00%)		

J. Gas system certification					
		Adequate	Inadequate	Odds ratio	95% confidence interval
Location	City centre	6 (60.00%)	7 (35.00%)	1.00	
	Periphery	4 (40.00%)	13 (65.00%)	3.77	0.65, 21.78
Property	Company-owned	6 (60.00%)	8 (40.00%)	1.00	
	Franchised	4 (40.00%)	12 (60.00%)	3.42	0.41, 28.50
Year of opening	< 2015	7 (70.00%)	10 (50.00%)	0.48	0.08, 2.81
	≥ 2015	3 (30.00%)	10 (50.00%)	1.00	
Number of users	< 100	1 (10.00%)	3 (15.00%)	4.20	0.26, 68.25
	≥ 100 \wedge < 1000	6 (60.00%)	10 (50.00%)	1.00	
	≥ 1000	3 (30.00%)	7 (35.00%)	0.69	0.08, 5.94
Total		10 (100.00%)	20 (100.00%)		

K. Cleaning and sanitizing procedures					
		Adequate	Inadequate	Odds ratio	95% confidence interval
Location	City centre	14 (51.85%)	30 (47.62%)	1.00	
	Periphery	13 (48.15%)	33 (52.38%)	1.48	0.55, 4.00
Property	Company-owned	18 (66.67%)	40 (63.49%)	1.00	
	Franchised	9 (33.33%)	23 (36.51%)	1.29	0.47, 3.57
Year of opening	< 2015	15 (55.56%)	32 (50.79%)	0.72	0.27, 1.90
	≥ 2015	12 (44.44%)	31 (49.21%)	1.00	
Number of users	< 100	4 (14.81%)	10 (15.87%)	0.83	0.20, 3.43
	≥ 100 \wedge < 1000	11 (40.74%)	36 (57.14%)	1.00	
	≥ 1000	12 (44.44%)	17 (26.98%)	0.39	0.14, 1.09
Total		27 (100.00%)	63 (100.00%)		

L. <i>L. pneumophila</i> containment procedures					
		Adequate	Inadequate	Odds ratio	95% confidence interval
Location	City centre	4 (33.33%)	40 (51.28%)	1.00	
	Periphery	8 (66.67%)	38 (48.72%)	0.69	0.14, 3.34
Property	Company-owned	9 (75.00%)	49 (62.82%)	1.00	
	Franchised	3 (25.00%)	29 (37.18%)	1.94	0.36, 10.38
Year of opening	< 2015	8 (66.67%)	39 (50.00%)	0.55	0.11, 2.66
	≥ 2015	4 (33.33%)	39 (50.00%)	1.00	
Number of users	< 100	2 (16.67%)	12 (15.38%)	0.35	0.03, 3.57
	≥ 100 \wedge < 1000	2 (16.67%)	45 (57.69%)	1.00	
	≥ 1000	8 (66.67%)	21 (26.92%)	0.32	0.04, 2.48
Swimming pool	Present	8 (66.67%)	9 (11.54%)	1.00	
	Absent	4 (33.33%)	69 (88.46%)	8.64*	1.63, 45.82
Total		12 (100.00%)	78 (100.00%)		

of gym equipment proved to be statistically insufficient in comparison with privately-owned gyms. Franchised facilities, are supposed to be less controlled by their managers, who are not always present in the premises; hence, lower prices for users are often related to a reduced quality. According to the location of the gym, instead, from a statistical point of view, the risk of finding the equipment not properly fixed to the floor was significantly lower in the suburbs than in the city centre. Such datum, which at first sight seems to be contradictory, might be explained by the fact that, in the city centre, gyms are very often equipped with wooden floors (parquet) and the managers are reluctant to drill them for fixing the tools to floor; this is irresponsibly justified by the need of modifying the internal layout of the gym by periodically moving the various tools. Furthermore, it is important to say that all the premises inspected (both privately-owned and franchised gyms) were rented; this explains the reluctance of most managers to make permanent and expensive changes to the structure especially in the city centre, where locations are definitely luxurious. Another statistically significant insufficiency concerned the lack of hygiene in the lockers and toilets for employees, in more crowded gyms with >1000 users compared to less crowded gyms with 100 to 999 users; a greater presence of people often resulted in poor hygiene as well as in an apparent neglect of the back rooms for employees which were not as well-kept as the areas for customers. Probably, the absence of procedures for *L. pneumophila* risk containment in the facilities not equipped with a swimming pool, highlights the fact that this problem is generally restricted to pools but not to other public facilities which are also equipped with running water. Nevertheless, a very common source of *L. pneumophila* are the showers (35, 36), so any gym facility is recommended to carry out activities for the containment of infections.

This study has enabled the Public Health Authority to obtain a clear picture of the gym environment in Milan; particular features have been highlighted as potential carriers of various insufficiencies, so that it will be possible to implement future investigations with a specific focus. Furthermore, some of the insufficient situations have been corrected and improved, also by making the staff aware of the existing problems.

Riassunto

Le problematiche principali delle palestre in una città italiana

Premessa. L'assenza di uniformità a livello nazionale circa i requisiti minimi delle palestre e la concomitante espansione e trasformazione del mondo del fitness, hanno portato ad una situazione non ben controllata; specialmente nelle grandi città metropolitane, nascono continuamente nuove palestre low-cost, a volte, senza sufficienti caratteristiche igienico strutturali.

Disegno dello studio. L'obiettivo di questo studio è valutare i risultati di programma di ispezioni nell'ambito delle palestre ed evidenziare gli aspetti più critici.

Metodi. Durante il 2018 è stato ispezionato un campione randomizzato di 90 palestre nella città di Milano, attraverso l'utilizzo di una checklist suddivisa in tre sezioni; i risultati sono stati analizzati mediante una serie di analisi multivariate.

Risultati. Tra i vari aspetti analizzati la maggior parte degli outcome insufficienti sono stati trovati nelle palestre in franchising, risultate carenti sotto diversi aspetti; inoltre, altro risultato di particolare interesse è la mancanza di procedure per il contenimento del rischio da *L. pneumophila* nelle palestre non dotate di piscina, rispetto quelle con piscina.

Conclusioni. Questo studio ha permesso di avere una fotografia del mondo delle palestre, identificando molte criticità sotto vari aspetti igienici e di sicurezza; ciò ha permesso di capire quali punti necessitano di un'attenzione particolare, e come indirizzare i prossimi controlli.

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